

Climate Connections – Background information

What levee construction holds the most force?

Background:

A levee is a type of dam that runs along the banks of a river or canal. Levees reinforce the banks and help prevent flooding. By confining the flow, levees can also increase the speed of the water. With a well-constructed levee, engineers can control the force produced by the flow of water and use it to create energy.

Introduction:

Along the Mississippi river, the levees are dry until the river floods in the spring. The levees allow the river to rise without flowing into adjacent land. Used this way, levees can be both good and bad. They can protect the property of people living and working along rivers but they can also break or the river can flood over them. The Mississippi used to flood hundreds of square miles of land in the spring. With levees, the river now stays in its channel. If a levee breaks, such as in the case of a massive storm, the river may flow through the breach and can inundate a huge area.

When building a levee, engineers need to consider the various types of materials and construction available to them. In this activity, you can examine which levee construction can hold the most force.

Hypothesis:

Students should write a statement about which type of levee construction they think will hold the most force, and explain why.

Variables:

The variables are levees made of the following materials:

- Levee 1 - Dirt
- Levee 2 - Dirt and Sand Mix
- Levee 3 - Dirt and Rock Mix
- Levee 4 - Dirt, Sand and Rock Mix
- Mixtures are made of equal parts
- All levees are equal size and shape

Control Group:

The control group is a levee made of dirt only.

Equipment:

- Fine particle dirt
- Play sand
- 2.5-centimeter rocks
- Wood
- Nails
- Shot-put ball
- Ruler

Procedure:

- Construct a ramp 100 centimeters long out of wood
- Position the ramp at a 26-degree angle relative to the floor
- Construct a levee out of dirt that is 25.4 centimeters wide at the base, 15.2 centimeters tall and at least 30 centimeters wide. Angle the sides of the levee to meet at the top
- Place the levee 30 centimeters from the front of the ramp
- Let the shot-put ball roll down the ramp, onto the flat and into the levee
- Repeat step 5 until the levee breaks (the shot-put ball rolls over the levee)
- Record the number of rolls until the levee breaks
- Repeat steps 3-7 for each levee material
- Repeat test twice for each levee construction

Results:

Levee	No. of rolls until broken (Trial 1)	No. of rolls until broken (Trial 2)
1 Dirt		
2 Dirt and Sand Mix		
3 Dirt and Rock Mix		
4 Dirt, Sand and Rock Mix		

Conclusion:

Students should write what they learned about levee construction and compare the results from the table above.